

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of cleaning a treatment chamber ~~connected to a vacuum pump, and a tank of a cleaning agent,~~ apparatus including a chamber, a susceptor in the chamber, a first tank of a treatment agent, a vaporizer to vaporize the treatment agent, a first pipe connecting the first tank and the vaporizer, a second pipe connecting the vaporizer and a first opening of the chamber, the second pipe supplying the vaporized treatment agent into the chamber, a second tank of a cleaning agent, a third pipe connecting the second tank and one of the first pipe and the second pipe, a vacuum pump, and a forth pipe connecting the vacuum pump and a second opening of the chamber to evacuate an atmosphere from the chamber, the method comprising:

forming a material including a metal on a wall inside the chamber of the treatment apparatus by supplying the vaporized treatment agent into the chamber;

heating the wall;

vaporizing the cleaning agent comprising one of a carboxylic acid and a derivative of carboxylic acid;

supplying the vaporized cleaning agent into the chamber through the first opening;

forming a metal complex of the metal and the cleaning agent on the heated wall by contacting the vaporized cleaning agent with the material;

subliming the metal complex on the heated wall under a reduced pressure; and

exhausting the sublimed metal complex from the chamber through the second opening.

2. (Canceled)

3. (Previously Presented) The method of cleaning of claim 1, wherein the cleaning agent comprises a compound selected from the group comprising RCOOH , RCOOR' , and $\text{R}(\text{COOH})_n$, wherein R, R' are hydrocarbon groups containing halogen atoms, and wherein n is an integer.

4. (Previously Presented) The method of cleaning of claim 1, wherein the cleaning agent comprises trifluoroacetic acid.
5. (Currently Amended) The method of cleaning of claim 1, wherein the treatment ~~chamber~~ apparatus is ~~a component of~~ one of a chemical vapor deposition equipment and a physical vapor deposition equipment.
6. (Currently Amended) The method of cleaning of claim 1, wherein in said vaporizing the cleaning agent, the cleaning agent is vaporized by a the vaporizer.
7. (Previously Presented) The method of cleaning of claim 1, further comprising supplying an additive to the vaporized cleaning agent to promote formation of the metal complex of the cleaning agent and the metal.
8. (Previously Presented) The method of cleaning of claim 7, wherein the additive includes oxygen or water vapor.
9. (Currently Amended) A method of cleaning a treatment ~~chamber connected to a vacuum pump, and a tank of a cleaning agent,~~ apparatus including a chamber, a susceptor in the chamber, a first tank of a treatment agent, a vaporizer to vaporize the treatment agent, a first pipe connecting the first tank and the vaporizer, a second pipe connecting the vaporizer and a first opening of the chamber, the second pipe supplying the vaporized treatment agent into the chamber, a second tank of a cleaning agent, a third pipe connecting the second tank and one of the first pipe and the second pipe, a vacuum pump, and a forth pipe connecting the vacuum pump and a second opening of the chamber to evacuate an atmosphere from the chamber, the method comprising:
 - forming a material including a metal on a wall inside the chamber of the treatment apparatus by supplying the vaporized treatment agent into the chamber;
 - heating the wall;
 - vaporizing the cleaning agent comprising one of a carboxylic acid and a derivative of a carboxylic acid;
 - supplying the vaporized cleaning agent into the chamber through the first opening;

forming a metal complex of the metal and the cleaning agent on the heated wall by contacting the vaporized cleaning agent with the material;

subliming the metal complex on the heated wall under a reduced pressure;

repeating said vaporizing the cleaning agent, repeating said supplying the vaporized cleaning agent, repeating said forming the metal complex, and repeating said subliming the metal complex; and

exhausting the sublimed metal complex from the chamber through the second opening.

10. – 16. (Canceled)

17. (Currently Amended) A method of cleaning a treatment ~~chamber connected to a vacuum pump, and a tank of a cleaning agent,~~ apparatus including a chamber, a susceptor in the chamber, a first tank of a treatment agent, a vaporizer to vaporize the treatment agent, a first pipe connecting the first tank and the vaporizer, a second pipe connecting the vaporizer and a first opening of the chamber, the second pipe supplying the vaporized treatment agent into the chamber, a second tank of a cleaning agent, a third pipe connecting the second tank and one of the first pipe and the second pipe, a vacuum pump, and a forth pipe connecting the vacuum pump and a second opening of the chamber to evacuate an atmosphere from the chamber, the method comprising:

forming a material including copper on a wall inside the chamber of the treatment apparatus by supplying the vaporized treatment agent into the chamber;

heating the wall;

vaporizing the cleaning agent comprising one of a carboxylic acid and a derivative of carboxylic acid;

forming a copper complex on the heated wall by contacting the vaporized cleaning agent with the material including copper;

subliming the copper complex with a heat source; and

exhausting the sublimed copper complex from the chamber through the second opening.

18. (Previously Presented) The method of cleaning of claim 17, wherein, in said subliming the copper complex, the copper complex is heated at a temperature of at least 150°C.
19. (Previously Presented) The method of cleaning of claim 17, wherein, in said forming a copper complex, the pressure of the vaporized cleaning agent is at least 10 Torr.
20. (Canceled)
21. (Previously Presented) The method of cleaning of claim 17, further comprising:
confirming the existence of the material inside the chamber; and
repeating said vaporizing the cleaning agent, repeating said supplying the vaporized cleaning agent, and repeating said subliming the copper complex, if the existence of material inside the chamber is confirmed.
22. (Previously Presented) The method of cleaning of claim 17, wherein in forming the material, the material including copper is formed from Cu^{+1} (hexafluoroacetylacetonate) and silylolefin ligand.
23. (Previously Presented) The method of cleaning of claim 22, wherein the silylolefin ligand is selected from the group consisting of trimethylvinylsilane (TMVS), dimethoxymethylvinylsilane (DMOMVS), methoxydimethylvinylsilane (MODMVS), trimethoxyvinylsilane (TMOVS), triethoxyvinylsilane (TEOVS), ethoxymethoxymethylvinylsilane (EOMOMVS), diethoxymethylvinylsilane (DEOMVS), diethoxymethoxyvinylsilane (DEOMOV), ethoxydimethoxyvinylsilane (EODMOV), ethoxydiethylvinylsilane (EODEVS), diethoxyethylvinylsilane (DEOEVS), dimethoxyethylvinylsilane (DMOEVS), ethoxydimethylvinylsilane (EODMVS), methoxydiethylvinylsilane (MODEVS) and ethylmethoxymethylvinylsilane (EMOMVS).
24. (Previously Presented) The method of cleaning of claim 9, wherein the cleaning agent is a compound selected from the group comprising RCOOH , RCOOR' , and $\text{R}(\text{COOH})_n$, wherein R and R' are hydrocarbon groups containing a halogen atom and n is an integer.

25. (Previously Presented) The method of cleaning of claim 9, wherein the cleaning agent comprises trifluoroacetic acid.
26. (Previously Presented) The method of cleaning of claim 17, wherein the cleaning agent is a compound selected from the group comprising RCOOH , RCOOR' , and $\text{R}(\text{COOH})_n$, wherein R and R' are hydrocarbon groups containing a halogen atom and n is an integer.
27. (Previously Presented) The method of cleaning of claim 17, wherein the cleaning agent comprises trifluoroacetic acid.
28. (Previously Presented) The method of cleaning of claim 1, wherein in said heating the wall, the wall is heated at a temperature of at least 300 °C.
29. (Previously Presented) The method of cleaning of claim 9, wherein in said heating the wall, the wall is heated at a temperature of at least 300 °C.
30. (Previously Presented) The method of cleaning of claim 17, wherein in said heating the wall, the wall is heated at a temperature of at least 300 °C.